REMARKS

The Office Action dated November 26, 2004 has been reviewed carefully and the application has been amended in a sincere effort to place it in condition for allowance.

Claim Rejections

Claims 24 – 30, 33, 37, 38, 41 – 51, and 54 – 62 were rejected under 35 U.S.C. § 102(e) as being anticipated by United States Patent No. 6,410,180 to Cisar et al. ("Cisar").

Applicant's invention as set forth in representative claim 24 comprises in part:

A direct oxidation fuel cell, comprising:

(A) a membrane electrode assembly disposed within a fuel cell housing, including

(i) a protonically conductive, electronically non-conductive membrane electrolyte having an anode face and an opposing cathode face;

(ii) ***an anodic metallic diffusion layer disposed generally parallel to said anode face of said membrane electrode assembly and having a plurality of openings therein, said openings being of a size so as to regulate mass transport of an associated fuel substance therethrough to said anode face of said membrane electrode assembly*** to produce electricity generating reactions and to allow the mass transport of carbon dioxide produced in said reactions away from said membrane electrode assembly;

(iii) an anode catalyst disposed generally between said anode face and said anodic metallic diffusion layer, and a cathode catalyst disposed generally between said cathode face of the protonically conductive, electronically non-conductive membrane electrolyte, and a cathode side of said housing, whereby electricity-generating reactions occur upon introduction of said associated fuel substance including anodic disassociation of said fuel substance into carbon dioxide, protons and electrons, and a cathodic combination of protons, electrons and oxygen from an associated source of oxygen, producing water; and

(B) a load coupled across an anode and cathode of said fuel cell, pro viding a path for said electrons produced at the anode by said electricity-generating reactions, to the cathode.

Briefly, Cisar teaches a fuel cell that includes a current conductor which includes metal grid 82. The metal grid is described as follows: "One aspect of the invention provides an electrically conductive member disposed within the electrode, rather than having a conductive cloth layer and a conductive frame disposed along a perimeter of the electrode. The electrically conductive member may be a sheet of expanded metal mesh or wire, preferably expanded metal mesh." (Cisar, Column 10, Lines 16 – 21).

This internally conductive element 82 is within the gas diffusion electrode as described at Column 12, Lines 39 – 41: "Also, a wide variety of materials may be suitable for use as the conductive metal element within the gas diffusions electrode."

Cisar further states "perforated metal sheets are also suitable as the conductive component within the electrode." (Cisar, Column 13, Lines 27 and 28).

In other words, Cisar teaches including a woven metal wire product disposed within an overall gas diffusion electrode component. The gas diffusion electrode is preferably comprised of uncatalyzed carbon gas diffusion layer 58 and an active electrocatalyst layer 56. A conductive metal grid 82 is disposed within the uncatalyzed carbon gas diffusion layer 58 (Cisar, Column 9, Lines 57 – 61).

Cisar describes a gas diffusion electrode because Cisar is directed to hydrogen fuel cells, in which the fuel is a hydrogen gas. The metal grid is disposed within the gas diffusion electrode to improve electrical conductivity.

There is nothing in Cisar which teaches a diffusion layer that is a metal component having pores or openings therein to regulate mass transport of the fuel substance as taught by Applicant. In sharp contrast, Cisar's gas diffusion layer is uncatalyzed carbon which has a metal grid disposed therein to improve conductivity. The metal grid of Cisar is simply not intended to and does not perform the function of regulating mass transport of reactants and products of the reaction in any way.

Therefore, Cisar is legally precluded from anticipating Applicant's invention under 35 U.S.C. § 102(e) because of the absence from Cisar of Applicant's novel anodic metallic diffusion layer disposed generally parallel to said anode face of said membrane electrode assembly and having a plurality of openings therein, said openings being of a size ***so as to regulate mass transport of an associated fuel substance therethrough*** to said anode face of said membrane electrode assembly.

Accordingly, Applicant's representative claim 24 and the claim dependent therefore are patentable over the Cisar reference. It is respectfully submitted that Applicant's new claims 114 through 122 are also not taught or suggested by the Cisar reference.

Claims 31, 32, 34 – 36, 39, 40, 52, and 53 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Cisar as applied to the above-mentioned claims in view of Yu et al., United States Patent No. 6,399,202 ("Yu").

The claims set forth by the Examiner with respect to this ground of rejection are dependent directly or indirectly upon claim 24. Based upon the reasons set forth herein, Cisar alone does not render the invention of Applicant's claims obvious.

Briefly, Yu discloses a gas diffusion electrode for use in a fuel cell system. Yu teaches, as the substance for the gas diffusion layer, a modified carbon product and wherein the modified carbon product may have a hydrophilic or hydrophobic organic group attached chemically to the carbon. The modified carbon product can be implemented with a controlled degree of hydrophobic or hydrophilic characteristics by using carbon particles modified with various functional groups. Yu contains no teachings regarding metallic diffusion layers, nor teachings about controlling or regulating the mass transport of reactants and products through a porous metallic diffusion layer as taught by Applicant. Thus, Yu alone does not render Applicant's invention obvious.

As noted herein, Cisar does not teach Applicant's metallic diffusion layer because Cisar does not suggest a diffusion layer at all, and particularly is silent as to metallic diffusion layers with pores sized to regulate the mass transport of reactants and products through the fuel cell, as claimed by Applicant. In addition, adding Yu's teaching of hydrophobicity or hydrophilicity to Cisar's metal grid still does not disclose, teach or suggest Applicant's claimed invention.

All independent claims are believed to be allowable over the cited prior art references.

All dependent claims are believed to be dependent from allowable independent claims.

Favorable action is respectfully solicited.

Please charge any additional fee occasioned by this paper to our Deposit Account No. 03-1237.

Respectfully submitted,

Rita M. Rooney
Reg. No. 30,585
CESARI AND MCKENNA, LLP
88 Black Falcon Avenue
Boston, MA 02210-2414
(617) 951-2500